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ABSTRACT

Relationships between first and third grade classroom instructional practices and child outcomes (i.e. test scores, days absent, and observed child behavior) were assessed in seven Project Follow Through educational programs. The programs chosen represented a wide spectrum of innovative educational theories. The range included two models based on positive reinforcement theory, a model based primarily on cognitive developmental theory, an open classroom model, and three other models drawn from Piaget, Dewey, and the English Infant Schools. Non-Follow Through classrooms were observed for comparison. Results showed that time spent in reading and math activities and a high rate of drill, practice, and praise contributed to higher reading and math scores. Children taught by these methods tended to accept responsibility for their failures but not for their successes. Lower absence rates and higher scores on a nonverbal program solving test of reasoning were attributed in part to more flexible instructional approaches in which children were provided with a wide variety of activities and materials and where children engaged independently in activities, selecting their own groups part of the time. (Author/BRT)

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RELATIONSHIPS BETWEEN CLASSROOM INSTRUCTIONAL PRACTICES AND CHILD DEVELOPMENT

by

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RELATIONSHIPS BETWEEN CLASSROOM INSTRUCTIONAL PRACTICES AND CHILD DEVELOPMENT

A comprehensive observation study of classroom processes and instructional practices in Follow Through Planned Variation projects was completed in August of 1974 by Stallings and Kaskowitz.[1] The Follow Through Program was established by Congress in 1967 under the Office of Economic Opportunity when it became apparent that a program was needed in the early grades of public school to reinforce and extend the academic gains made by economically disadvantaged children enrolled in Head Start or similar preschool programs. Project Follow Through was and is a "planned variation" research design; that is, the goal is to examine the differential effectiveness of programs based on divergent educational and developmental theories.

Of 22 Follow Through educational programs, seven were selected for observational study. Those chosen represent a wide spectrum of innovative educational theories. The range includes two models based upon positive reinforcement theory (from the University of Kansas and the University of Oregon), a model based primarily upon the cognitive developmental theory of Jean Piaget (High/Scope Foundation), an open classroom model based upon the English Infant School theory (Education Development Center), and three other models drawn from Piaget, John Dewey, and the English Infant Schools (Far West Laboratory, University of Arizona, and Bank Street College).

The first part of the study examined how well the educational models had been implemented. The findings suggest that most teachers were implementing the models according to sponsor specifications. The second part of the study, to which this paper is addressed, examined the relationships between classroom instructional practices and child outcomes (i.e., test scores, days absent, observed child behaviors).

Sample

Four first grade and four third grade classrooms were observed in 36 cities and towns. This represented five projects for six Follow Through educational models and six projects for University of Arizona's model. One first grade and one third grade Non-Follow Through classroom were selected for comparison at each project. These Non-Follow Through classrooms were combined to form a pooled comparison group. The projects included in the sample represented all geographic regions, urban and rural areas, and several racial and ethnic groups.

Selections of observation sites were based upon the following criteria: (1) that they were among the sites where pupil testing was to occur in Spring 1973 as part of the Follow Through evaluation; (2) that each sponsor would as much as possible have a balanced geographic distribution of sites which included urban-rural and north-south projects; and (3) that each sponsor would have included at least two sites which he considered well implemented.

Of the classrooms observed, a total of only 105 first grades and 58 third grades met the criterion of having both baseline and Spring 1973 test scores, and only these classrooms were included in the study of classroom processes and child outcomes. The smaller number of third grade classrooms reflects the attrition of children with baseline data. Table 1 indicates the number of classrooms per sponsor included in the study. All sponsors' classrooms and Non-Follow Through classrooms which were both observed and had sufficient baseline data were merged in the study. Thus, the study is one which examines classroom processes regardless of model and relates the processes to child outcomes. This procedure provides a wide range of classroom processes to be examined. The unit of analysis in this study was the classroom.

Measurements

Classroom Processes

The SRI Classroom Observation Instrument was employed to gather data about classroom environment and processes. The instrument was initially developed in 1969 with the assistance of eight Follow Through sponsor representatives with a goal of being flexible enough to record the salient features of a variety of program components.

The instrument consists of five sections:

- Classroom Summary Information (CSI)--The CSI is filled out once each day. It identifies the sponsor and teacher and provides information on the number of teachers, aides, volunteers, and students, and the class duration.

- Physical Environment Information (PEI)--The PEI is filled out once each day. It provides information on the seating patterns and on the presence and use of equipment and materials.

- Classroom Check List (CCL)--A CCL is filled out about four times an hour. It provides information on the grouping of children and teaching staff and activities in the classroom.

- Preamble (PRE)--A Preamble is filled out subsequent to each CCL. It contains information about the activity and role of the person who is the focus of the FMO interactions.

Table 1

NUMBER OF CLASSROOMS AND SITES INCLUDED IN THE PARTIAL CORRELATIONS AND REGRESSION ANALYSES BY SPONSOR AND GRADE LEVEL

Sponsor	First Grade		Third Grade	
	Number of Classrooms	Number of Sites Represented	Number of Classrooms	Number of Sites Represented
Far West Labs	12	3	14	4
University of Arizona	14	4	2	1
Bank Street College	11	4	7	2
University of Oregon	5	2	4	1
University of Kansas	17	5	12	4
High/Scope	13	4	0	0
EDC	12	3	6	2
Non-Follow Through	24	-	13	-
Total Number of Classrooms	108		58	

- Five-Minute Observation (FMO)--The FMO is filled out subsequent to each Preamble. It contains information in the form of coded sentences concerning the type of interactions occurring in the classroom. The information includes the parties to the interaction, the type of interaction, and the quality of the interaction.

Four dimensions of reliability have been examined in the main report of Stallings and Kaskowitz: day-to-day stability of classroom processes, observer reliability, confusability of the operational definitions of the observation codes, and anomalies in the data collected. Classrooms were found to be acceptably stable on observed variables from one day to another. Codes found to be unreliable were omitted from further study.[2] Anomalies in the data were deleted where warranted; for example, if the teacher went home sick in the middle of the morning, that day's observation was deleted.

Child Measures

The entering ability of the children was assessed by the Wide Range Achievement Test (WRAT) which was administered to the children when they first entered school, either at the kindergarten or first-grade level.

Reading and math skills were assessed by the Metropolitan Achievement Test (MAT) in both first and third grades.

Problem-solving skills (perceptual) were assessed in third grade only, using the Raven's Coloured Progressive Matrices (Raven's). This test was designed by John C. Raven (1956) as a culture-fair test of nonverbal reasoning, or fluid problem-solving ability in visual perceptual tasks.

The Intellectual Achievement Responsibility Scale (IAR), used in the third grade only, assessed the extent to which the child takes responsibility for his own successes or failures or attributes his achievements to the operation of external forces (e.g., luck or fate).

Child behaviors were assessed through systematic observations recorded on the SRI Observation Instrument. The behaviors reported here are independence, task persistence, cooperation, and question asking.

Absences from school were determined from school records.

Statistical Procedures

To examine relationships between observed classroom practices and child outcomes, partial correlations were computed, holding constant the baseline WRAT scores. Table 2 describes the process variables used in these computations. Stepwise regressions were computed using selected observed process variables and all child outcomes; the WRAT entered the regression equation first.

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Table 2

PARTIAL CORRELATION ANALYSES

	Number of Process Variables	Number of Classrooms
Child Behaviors		
First Grade	28*	105
Third Grade	28	58
Days Absent		
First Grade	340	108
Third Grade	340	58
Raven's--Third Grade	340	58
Coopersmith--Third Grade	340	58
IAR--Third Grade	340	58
MAT		
First Grade	340	108
Third Grade	340	58

*The 28 variables are a subset of the 340 variables used in the other analysis.

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Results

Reading Achievement Results

Out of a possible 340 correlations between reading achievement and classroom processes, 118 were significantly related at the .05 level. Of these, the most strongly correlated variables suggest that the length of the school day and the average time a child spent engaged in a reading activity were related to higher reading scores in both first grade and third grade. When the school day is longer, the children have more opportunity to engage in reading. The length of the school day for the classrooms in the evaluation varied among schools by as much as two hours. Higher reading scores were also found in classrooms where there was more reading or discussions of reading between adults and children. Thus, opportunity and exposure to reading had an important relationship to good performance on tests.

Higher reading scores were obtained in classrooms using systematic instructional patterns where the teacher provides information and asks a question about the information. The child responds and the teacher immediately lets the child know whether the response is right or wrong. If he is wrong, the child is guided to the correct answer. If he is correct, he receives praise, a token, or some form of acknowledgment. These preliminary findings suggest this type of positive reinforcement contributed to higher reading test scores in both first and third grades.

Small groups were most effective for teaching first grade reading, while large group instruction worked well in the third grade. In classrooms where children worked by themselves and were task persistent (maintained their attention on their studies without teacher guidance), they also achieved higher reading scores. In classrooms where textbooks and programmed workbooks were used most often, the reading scores were higher. Also, in classes where a greater-than-average amount of time was spent on social studies, the reading scores were higher. Obviously, reading skills are used in social studies projects, but it is of interest to note that experience in social studies was related to reading scores.

It is noteworthy that the University of Oregon and the University of Kansas, both of which are models that use the classroom procedures described here, showed greater gains in first grade reading than the other five sponsors and greater gains than Non-Follow Through classes.

Math Achievement Results

Out of a possible 340 correlations between math achievement and classroom processes, 108 were significantly related at the .05 level. Of these, the most strongly correlated variables suggest that, as in reading, the length of the school day and the average length of time each child spent in math activities were related to higher math scores in both first and

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third grades. Thus, the opportunity a child had to engage in math, either in formal instruction or in less formal exploratory activities (e.g., working with, or just "messing with," weights and measuring tools) contributed to higher scores in math. Also, in classrooms where adults and children more often discussed or talked about mathematical problems and concepts, the test scores in math were higher. The value (in terms of math scores at the end of the third grade) of spending large amounts of class time on math was especially marked for the children whose numerical ability was weak when they entered school.

The effect of praise on achievement in math in first grade was variable: in classrooms where children had relatively low entering ability, the children profited more from a high rate of praise than they did in classrooms where the students had higher entering ability. This type of information could be useful in planning educational programs to enhance the learning of children with differing abilities at different age levels.

As in reading, children had higher math scores in classrooms where teachers used systematic instructional patterns; that is, the teacher provides information and asks a question about the information. The child responds and the teacher immediately lets the child know whether the response is right or wrong. If he is wrong, the child is guided to the correct answer. If he is correct, he receives praise, a token, or some other form of acknowledgment. This positive reinforcement contributed to higher scores on math tests in both grade levels.

In classrooms where textbooks and programmed workbooks were used frequently, the test scores on math were especially high. In addition, the use of instructional materials such as programmed materials, Cuisenaire rods, or Montessori materials contributed to higher math scores.

In first grade classrooms where children were taught in small groups, the math scores were higher. In third grade, large group instruction contributed to higher scores. When children could work by themselves some of the time and could persist at a task, they were also more likely to have higher scores in math achievement.

University of Kansas, which used the classroom procedures described here as contributing to higher math scores, had higher scores in first grade math than the other six sponsors and Non-Follow Through classes. University of Oregon, which also used these instructional processes in their classrooms, had higher scores in the third grade math than the other six sponsors and Non-Follow Through classes. These findings strongly suggest that classroom procedures used in University of Kansas and University of Oregon classrooms contributed to child achievement in math.

Raven's Problem Solving Test Results

Out of a possible 340 correlations between the Raven's Problem Solving Test and classroom processes, 114 were significantly related at the

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.05 level. Of these, the most strongly correlated variables suggest that high scores on Raven's Coloured Progressive Matrices (a test of nonverbal perceptual problem solving) tended to be earned by children in the more flexible classrooms where a wide variety of materials are used, many different activities occur, and children are allowed to select their own groups and seating part of the time. In these more flexible classrooms, children have more opportunities to manipulate materials and discover the relationships between items to see how things fit together. In these classrooms, adults interact with children on a one-to-one basis, more open-ended questions are asked, and children show more verbal initiative. Far West Laboratory, University of Arizona, Bank Street College, High/Scope Foundation, and Educational Development Center use these processes, and the classrooms in these models had higher scores on the Raven's than did the classrooms in the University of Kansas and University of Oregon models.

Responsibility Scale Results

Out of a possible 340 correlations between the Intellectual Achievement Responsibility Scale and classroom processes, 106 were significantly related at the .05 level. Of these, the most strongly correlated variables suggest that children in the more open classrooms earned higher scores on the Intellectual Achievement Responsibility Success Scale. Our results indicate that children from the more flexible classrooms took responsibility for their own success but not for their failure. Children from the more highly structured classrooms took responsibility for their own failure but attributed their success to their teacher's competence or other forces outside themselves. Only the classrooms of Educational Development Center had scores indicating that the children took responsibility for both their success and failure.

Days Absent Results

The absence rate is important for several reasons; e.g., many school budgets are determined by the average daily attendance. Also, days absent can be used as an indicator of attitude toward school. It is well known to parents and teachers that if a child enjoys school, he may attend even if he does not feel very well. If he does not like school, he is more likely to stay home whenever he feels any discomfort.

Out of a possible 340 correlations between days absent and classroom processes, 102 were significantly related at the .05 level. Of these, the most strongly correlated variables suggest that in both first and third grade classrooms, children are absent less frequently in open classrooms--that is, in classrooms where there is a high rate of child independence, child questioning, adults responding, individualized instruction, and open-ended questioning. Also, in classrooms where children and adults smiled and laughed more often, the children were absent less often.

Children in both first and third grade were absent more frequently from classrooms where they worked in large groups more often and where adults

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used direct questions in academic work and frequent corrective feedback. Findings for the third grade indicate that in classrooms where children were punished they also were absent more often. In addition, classrooms with a higher rate of negative, harsh, or demeaning statements on the part of teachers and students showed a higher absence rate.

The findings in this report of absence rate indicate that at the first grade level, children in classrooms of sponsors who used more highly structured environments, materials, and interactions also had a higher absence rate. Classrooms of three sponsors, Far West Laboratory, University of Arizona, and High/Scope Foundation, models which used a wide variety of activities and materials, had children who had lower absence rates than children in classrooms of other sponsors and Non-Follow Through classrooms. As might be expected, the absence rate for all sponsors and Non-Follow Through diminished from first grade to third grade.

Child Behaviors Results

Table 3 presents the results of the partial correlations for child independence, task persistence, cooperation, and question asking.

Independence--In our study, independence is defined as a child or children engaged in a task without an adult. This type of independent behavior is more likely to be found in classrooms where teachers allow children to select their own seating and groups part of the time, where a wide variety of activities is available, and where an assortment of audiovisual and exploratory materials is available. The adults provide individual attention and make friendly comments to the children.

Our investigations indicate that children in the classrooms of Educational Development Center and Far West Laboratory showed more independence than did the children in Non-Follow Through and the other five sponsors' classrooms.

Task Persistence--For this study, task persistence is defined as a child engaged in self-instruction over a few minutes or more. If the child becomes engaged in a conversation with someone else during the task, the observer no longer codes task persistence. The highest positive relationships indicate that task persistence occurred most often when textbooks and workbooks were used in the classroom. Where adults instructed one child at a time, the children were also likely to be more task persistent. This may be because young children often have difficulty understanding group instructions. However, in settings where adults work with children on a one-to-one basis, children can have a question answered or directions clarified and then go ahead independently with the task at hand.

University of Arizona and University of Kansas had higher scores on task persistence than do the other five models and Non-Follow Through.

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Table 3

PARTIAL CORRELATIONS OF INSTRUCTIONAL VARIABLES
AND CHILD BEHAVIORS
(Fall 1971 WRAT Partialed Out)

Instructional Variables	Correlations			
	Independence	Task Persistence	Cooperation	Child Questions
Child/Adult Ratio	.23*	.09	.02	-.15
Children Select Groups and Seats Part of the Time	.36***	-.22*	.19*	.03
Instructional Materials Used	-.01	.11	.09	-.07
Audiovisual Equipment Used	.13	-.25**	.15	-.12
General Equipment and Materials	.22*	-.08	.09	.005
Total Resource Materials Used	.13	-.23*	.18	.03
Wide Variety of Activities Occur Concurrently	.22*	-.12	.15	.09
Wide Variety of Activities Occur During the Day	.43***	-.36***	.32**	.14
An Adult with One Child	.57***	-.16	.08	.14
Use of TV	-.03	-.10	-.11	-.03
Audiovisual Equipment Used in Academic Subjects	.24**	-.25**	-.01	-.04
Exploratory Materials Used in Academic Subjects	.34***	-.22*	.27**	-.11
Math or Science Equipment Used in Academic Subjects	-.18	.17	-.18	.11
Textbook and Workbooks Used in Academic Subjects	-.33***	.31**	-.49***	-.04
Puzzles and Games Used in Academic Subjects	.16	-.07	.09	-.07
Adults Asking Children Questions	-.17	.03	-.17	-.04
Adult Instructs an Individual Child	-.09	.23*	-.17	.22*
Adult Comments to Children	.22*	-.12	-.13	.36***
Adult Task Related Comments to Children	.12	-.24*	.39***	-.16
Adult Acknowledges Children	-.16	.15	-.11	.04
Adult Praises Children	-.60***	.20*	-.21*	.02
Adult Speaks to One Child	-.01	.13	-.06	.38***
Adult Speaks to Two Children	.29**	-.13	.28**	-.03
Adult Speaks to a Small Group	-.15	.19*	.01	-.32***
Adult Asks Direct Question about Subject Matter	-.41***	.07	-.28**	.03
Adults Ask Open-Ended Thought-Provoking Questions	.16	-.12	.13	-.07

* $p < .05$
** $p < .01$
*** $p < .001$

Number of classrooms used in the correlation computations = 105 first grades.

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Cooperation--For this study, cooperation is defined as two or more children working together on a joint task. This kind of cooperation is more likely to be found in classrooms where a wide variety of activities occur throughout the day, where exploratory materials are available, and where children can choose their own groupings. If the adults interact with two children, asking questions and making comments about the task, the children seem to be encouraged to join each other in cooperative tasks.

The children in the Bank Street College, High/Scope Foundation, and Educational Development Center programs more often joined each other in a cooperative task than did children in the other four models and Non-Follow Through children.

Question Asking--Educators have long recognized the value of a child's asking questions as a primary means to gain information. Previous research indicates that question asking is positively related to test scores.[3] In our study, we found that first grade children asked more questions where there was a one-to-one relationship of adult with child in classrooms, where adults responded to children's questions, and where adults made general conversational comments to children.

Children in classrooms using Far West Laboratory, Bank Street College, University of Kansas, High/Scope Foundation, and Educational Development Center programs ask questions more often than do children in the Non-Follow Through classrooms.

Child Outcome Scores Explained by Entering Ability[4] and Classroom Processes

Whether or not classroom procedures affect the growth and development of children has been seriously questioned by other research (Coleman, Jencks, Herrnstein, Moynihan, and Mosteller). Their research has indicated that a child's entering aptitude is of primary importance and, in fact, governs what the child will achieve in school. The study reported here, however, found that observed classroom procedures contributed as much to the explanation of test score differences as did the initial ability of children. Table 4 presents findings from a stepwise regression where the WRAT score was entered into the regression first. The third and seventh columns report that part of the variance explained uniquely by the process variable.

In both first and third grades, child behavioral outcomes were only slightly explained by entering aptitude. As might be expected, these behaviors were much more related to classroom processes.

Very little of the absence rate was explained by entering ability, in either first or third grade. Approximately 60 percent of the variance was explained by the instructional procedures used in the classroom, suggesting that what occurs in classrooms is related to whether or not the child stays away from school.

Table 4

SUMMARY STATISTICS FOR THE STEPWISE REGRESSION ANALYSES

Outcome Variable	First Grade (N=105)				Third Grade (N=58)			
	R^2_{WRAT}	$R^2_{WRAT, Process Variables}$	Process Variables (Unique)	Number of Process Variables (included in regression)*	R^2_{WRAT}	$R^2_{WRAT Process Variables}$	Process Variables (Unique)	Number of Process Variables (included in regression)*
Behavioral Outcome Variables								
Child Questions	.00	.28	.28	2	.00	.29	.29	3
Self-Esteem	.00	.48	.48	5	.01	.42	.41	6
Child Independence	.00	.67	.67	5	.01	.41	.40	3
Task Persistence	.00	.44	.44	9	.06	.61	.55	6
Cooperation	.00	.32	.32	2	.10	.61	.51	5
Verbal Initiative	.00	.22	.22	3	.00	.38	.38	2
Days Absent	.01	.67	.66	14	.07	.69	.62	6
Test Outcome Variables								
MAT Math	.32	.74	.42	10	.17	.81	.64	8
MAT Reading	.50	.73	.23	8	.42	.79	.37	7
Raven's	--	--	--	--	.41	.86	.45	9
IAR-Success	--	--	--	--	.18	.57	.39	4
IAR-Failure	--	--	--	--	.04	.83	.79	11

*This column contains the number of process variables that entered the stepwise regression with an "F-to-enter" that was significant at .05.

The achievement of a child in math at the end of first grade can be attributed in part to his ability as it was measured when he entered school, but even more so by the instructional practices used by his teachers. In first grade, entering ability accounts for approximately 40 percent of the achievement (Table 4). By the third grade, less of the achievement can be attributed to entering school ability and more to classroom practices. Table 5 lists those process variables which entered the stepwise regression.

In first grade we found that a variable which describes a stimulus/response/feedback (S/R/F) sequence of interaction entered the regression equation after the WRAT and explains 13 percent of the variance of the math scores. Eight of the 10 variables which entered the equation are related to this S/R/F sequence.

In third grade, 25 percent of the test score variance is explained by the process variables which describe adults asking children questions about academic subject matter. The WRAT only explains 17 percent of the variance.

Approximately 50 percent of first grade reading achievement can be attributed to the entering ability of the children. The instructional procedures used by teachers account for approximately 25 percent of the reading achievement. The variables which entered the equation are listed on Table 6.

In the first grade, the total number of verbal interactions which were related to reading accounted for 12 percent of the variance in first grade reading scores. The other variables which entered the equation were primarily related to average amount of time spent in reading and stimulus/response/feedback variables.

In third grade, reading success can be attributed about equally to the instructional procedures used by teachers and the entering ability of the children.

Table 6 displays data that indicates that an adult working with a large group of children accounts for 16 percent of the third grade reading score variance. Total academic verbal interaction accounts for less of the variance (4 percent) in third grade than in first grade. This may be explained by the fact that third grade children may not need as much interaction with adults about reading and work more on their own.

One of the most important findings centers around the Raven's test of nonverbal reasoning or perceptive problem solving (considered to be a culture-fair test of fluid intelligence). The abilities required to function well on this test have not been considered to be influenced by environment. This study found that ability to perform well on the Raven's test was related to the classroom environment and strongly suggests that children who, for a period of three years, have been in classrooms that use a wide variety of activities and provide a wide variety of manipulative materials have leanred to see the relationship between parts and wholes. At any rate, they learn to see spatial relationships similar to those tested on the Raven's.

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Table 5

STATISTICS FROM THE STEPWISE REGRESSION OF THE BASELINE WRAT AND SELECTED COI VARIABLES ON THE OUTCOME SCORES

	Variable Name	Multiple R	R^2	RSQ Change	F-to-Enter
Dependent Variable: MAT Math					
First Grade (N = 105)					
1	F71 WRAT	.59	.32	.35	56.10
2	Adult feedback to children responding to adult academic command or question	.70	.49	.13	26.32
3	Child extended response, nonacademic	.74	.55	.07	14.57
4	Adult positive corrective feedback, academic	.77	.59	.04	10.79
5	Adult communication or attention focus, group	.79	.63	.03	8.31
6	All adult reinforcement with tokens	.81	.65	.03	8.20
7	Child extended responses, academic	.83	.68	.03	8.07
8	Adult communication, request, and direct question to individual child, academic	.84	.70	.02	6.39
9	Social interaction	.85	.71	.01	4.54
10	Child responses, academic	.85	.73	.01	4.18
11	Adult neutral corrective feedback, academic	.86	.74	.01	4.24
Third Grade (N = 57)					
1	Classroom mean F69 WRAT	.41	.17	.17	11.10
2	Adult academic command, request, and direct question to children	.64	.41	.25	22.48
3	Large group with any adults	.74	.55	.14	16.39
4	Child self instructs, academic, with objects	.79	.62	.06	8.69
5	Child presents information to a group	.82	.67	.05	8.20
6	Numbers, math, arithmetic	.85	.72	.05	8.87
7	Child selection	.87	.76	.04	8.48
8	Social interaction	.89	.79	.03	6.32
9	Child's extended response to question	.90	.81	.02	4.62

Table 6

STATISTICS FROM THE STEPWISE REGRESSION OF THE BASELINE WRAT AND SELECTED COI VARIABLES ON THE OUTCOME SCORES

	Variable Name	Multiple R	R^2	RSQ Change	F-to-Enter
Dependent Variable: MAT Reading					
First Grade (N = 105)					
1	F70 WRAT	.71	.50	.50	103.40
2	Total academic verbal interaction	.79	.63	.12	33.89
3	Total weight in reading groups	.81	.65	.02	6.47
4	Individual child response to adult academic command, request, or direct questions	.81	.66	.01	3.57
5	All adult reinforcement with tokens	.81	.68	.02	6.13
6	Child extended response, academic	.83	.70	.02	5.01
7	Adult neutral corrective feedback, academic	.84	.71	.01	4.62
8	Teacher with large group	.85	.72	.01	3.72
9	Adult with large group	.86	.73	.01	4.42
Third Grade (N = 57)					
1	F70 WRAT	.65	.42	.42	40.01
2	Large group with any adults	.76	.58	.16	20.75
3	Child/teacher and aide ratio	.79	.62	.04	5.25
4	Total academic verbal interaction	.81	.66	.04	6.68
5	Total class duration	.84	.70	.04	6.48
6	Small group with any adults	.87	.75	.05	10.07
7	Child selection	.88	.77	.02	4.45
8	Large group with any adults	.89	.79	.02	4.08

Conclusions

A study of the instructional procedures used in classrooms and the achievement of children indicates that time spent in reading and math activities and a high rate of drill, practice, and praise contribute to higher reading and math scores. Children taught by these methods tend to accept responsibility for their failures but not for their successes. Lower absence rates, higher scores on a nonverbal problem solving test of reasoning can be attributed in part to more open and flexible instructional approaches in which children are provided a wide variety of activities and materials and where children engage independently in activities and select their own groups part of the time.

Classroom instructional processes predicted as much or more of the outcome score variances than did the entering school test scores of children. Based upon these findings, we conclude that what occurs within a classroom does contribute to achievement in basic skills, good attendance, and desired child behaviors.

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Footnotes

1. Stallings, Jane, and David Kaskowitz, Follow Through Classroom Observation Evaluation 1972-1973, Menlo Park, CA: Stanford Research Institute, 1974.

2. Stallings, Jane A., and Phillip A. Giesen, A Study of Reliability in Observational Data, Menlo Park, CA: Stanford Research Institute, 1974.

3. Stallings, Baker, and Steinmetz (1972) and Stallings (1973) report that an increased frequency of children asking questions is related to higher scores on achievement tests and attitudinal tests.

4. Measured by the Wide Range Achievement Test administered when the child entered school.